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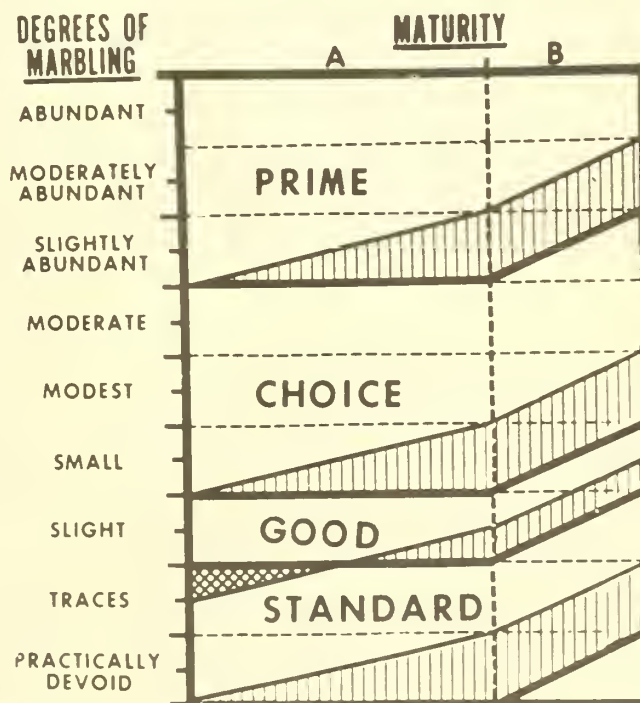
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PROPOSED CHANGES IN THE RELATIONSHIP BETWEEN MARBLING, MATURITY, AND QUALITY GRADE



||| Areas which would be included in the next higher grade.
Area which would be changed from Good to Standard.

A COMPARISON OF PRESENT AND PROPOSED BEEF GRADES^p

by Kenneth E. Nelson and Roy N. Van Arsdall¹

Because of widespread interest among the livestock-meat industry in the proposed changes in beef grade standards, the Outlook and Situation Board is publishing this article as a special supplement to the *Livestock and Meat Situation*. The article is based on a study made by the Economic Research Service at the request of the Office of the Secretary to aid officials of that office and the Agricultural Marketing Service in evaluating the proposed changes in beef grades as announced on September 10, 1974.

Beef production in the United States has totaled around 22 billion pounds in recent years. About 3/5ths. of the quantity produced has been officially graded by U.S.D.A. Of that graded, about 80 percent was Choice, 12 percent Good, and 6 percent Prime with the remainder falling into processing grades. The Choice grade has long been considered an assurance of high palatability to consumers and a target for producers.

A change in grading standards has been proposed which would change the marbling and maturity requirements for the higher grades of beef, eliminate the use of conformation as a factor in determining quality grade, narrow the requirements for the Good grades, and require that all beef graded for quality also be yield graded. The greatest impact of the change would be on the Good and Choice grades which have accounted for over 90 percent of all beef officially grade-marked by U.S.D.A. in recent years. This article examines the proposed grade changes with respect to stated objectives and functions of grades and possible effects on industry segments.

BEEF GRADING

USDA's voluntary grading system has long been an institutionalized part of the beef industry in the United States. Most fed beef is examined for grade, though not always grade marked. Both Government and private agencies report prices by USDA grades, and most livestock and meat transactions involve USDA grades in price negotiation.

There are eight quality grades included in the present standards. Prime, Choice, and Good are the most familiar to the public and most relevant to fed cattle.

Major Components of Beef Grades

Present quality grading standards involve palatability indicating characteristics, combined with conformation to form a final grade. Marbling and maturity have the greatest bearing on the quality grade. Conformation considers the proportion of meat to bone and of high to low value cuts. Marbling in excess of the minimum necessary for a grade can compensate for a lack of conformation, and conformation can compensate for marbling except in the Choice and Prime grades. Yield grading is available on an optional basis to identify cutability differences among beef carcasses.

Evaluation of the Components of Beef Grades

Controversy still exists regarding the relevance and value of the different components that comprise USDA beef grades. Nevertheless, research and experience over the years have resulted in increasing agreement.

Marbling and maturity: Marbling is the factor longest considered an important palatability attribute. It has been associated with juiciness, tenderness and flavor. As animals mature, muscle tends to become dryer, darker in color, coarser in texture, stronger in flavor; and, at least at ages beyond 30 months, tougher. Marbling tends to improve palatability, particularly juiciness and flavor.

Although many studies have sought to identify the relationships among marbling, age, tenderness, and flavor, this has proven to be a very complex field. Positive correlations have been found, but only in weak and vague terms. Marbling has more influence on palatability as animals mature. However, in the case of young animals, such as those within the "A" maturity group of 9 to 30 months, increased marbling associated with maturity has less effect on palatability.

Conformation: For many years conformation has been considered to be an indicator of the ratio of meat to bone and of high to low value cuts. Research has shown that conformation is not a significant factor in palatability. In addition, some researchers have questioned its bearing on cutability.

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Yield grade: Yield grading was introduced on a voluntary basis in 1965 and an increasing proportion of carcasses have been yield graded since that time. The specifications state that a carcass typical of its yield grade (yield grades number 1 through 5) will cut out about 2.3 percent more retail product from the round, loin, rib, and chuck than the next lower (higher number) yield grade. The measures or estimates used in the yield grade equation are hot carcass weight; percent kidney, pelvic and heart fat; fat thickness at the twelfth rib; and ribeye area. Research has generally supported the use of yield grades when trimming of carcasses is uniform. The final trim on retail cuts, however, has a large effect on the actual realized cutout on a given carcass.

Other factors: Color, firmness, and texture of the meat affect grade only if they are unusual for the maturity of the carcass being graded.

PRESENT AND PROPOSED STANDARDS

The proposed changes can be discussed in three categories: (1) Marbling and maturity, (2) conformation, and (3) yield grade.

Marbling and Maturity

Figure 1 displays the current and proposed standards for the relationship among marbling, maturity, and quality. The present marbling requirements are indicated by the light lines and the proposed standards by the heavier lines. The sections marked with parallel lines indicate a change to the next higher grade. The crosshatched area indicates a change from Good to Standard. A further change not indicated by Figure 1 reduces the maximum maturity allowable in the Good and Standard grades to that of Choice and Prime. The youngest cattle qualifying as beef are of "A" maturity (approximately 9 to 30 months of age). Under the proposal no increased marbling is required for increasing maturity within the "A" maturity range. With "B" maturity, increasing marbling is required with the same slope as in the current standards.

Conformation

Under the proposal, conformation would be eliminated from the factors used in determining the quality grade.

Yield Grade

Currently, carcasses may be either quality graded or yield graded or both. Under the proposed standards, carcasses, if graded must be identified for both.

What are Grades and What Should They Do?

In order to analyze the effects or judge the wisdom of a proposed grade change, some thought should be

given to the function of grades. Grading can be defined as a method of classifying or grouping units of a commodity such that the variation or change in quality is smaller within the group than over the whole range of the commodity.

Industry objectives for grades have differed. Traders were first interested in having an unambiguous and consistent language for market news reporting and maintaining consistent supplies of goods. Early support for beef grading among farmers and their representatives was producer-oriented with a view toward the promotion of purebred cattle, although there was an agreement that grades should have meaning to consumers. Consumers were not a strong force in formulating grades, although their support has been important in preserving them. Most would agree that grades are helpful to consumers if they allow more informed shopping. Whether grades should attempt to indicate rank ordering of palatability, nutritional content, or only categorize according to "relevant criteria" is a personal judgment. Unless all consumers agree on which quality group is best, grades should probably be descriptive.

Diverse objectives or functions ascribed to grades and grading by economists may be summarized and abbreviated by directing production towards those items most demanded by consumers. Grades are beneficial if they (1) help consumers to gain maximum satisfaction from their dollars and (2) assist producers and marketing firms in allocating resources efficiently and equitably.

IMPLICATIONS

Are the grade changes consistent with economic objectives? How might separate industry segments be affected? What reallocation of resources might be expected due to the adoption of the proposed grade change?

Economic Objectives

Conformation: Conformation as presently identified is not a good criterion for carcass grading. It has served to change the quality group or grade assigned to a carcass. Therefore, it has added variability within quality classes.

Its elimination, especially with the availability of the yield grade, which does a better job of measuring the effects of differences in cutability, is consistent with increasing homogeneity within a quality class, without affecting the number or width of grades.

Yield grade: Variation in cutability exists within quality grades (under both the current or proposed standards). The yield grade explains an important part of this variability. Yield grade, therefore, identifies the variation in cutability within quality grades and has the potential for improving pricing accuracy.

Marbling and Maturity

These factors are a part of the grade standards solely to classify beef for eating quality. The proposed change is merely a definitional one. If it results in more homogeneous grouping of real and valuable attributes within grades, then the change is desirable. The direction of the change is consistent with recent palatability research.

Effect on Industry Segments

Consumers: The part of the change of direct concern to consumers is the marbling and maturity relationship. This change is small and probably undetectable to consumers for beef in the Prime and Choice grades. The variation within the Good grade should be reduced to an extent noticeable to consumers having access to meat graded Good. The consumer could be indirectly affected by lower relative prices of Choice if the supply of Choice should increase dramatically due to the change, and by lower prices in general if efficiency of the industry is improved.

Retailers: Many retailers have found it profitable to carry only one grade of beef, often Choice or a branded product consisting of Good as well as other grades. If the demand for Good increases, they may find it profitable to carry both Good and Choice.

Retailers who have successfully specialized in merchandising "top Good" beef under a brand name may find some of their supply gone to the Choice grade. These retailers would have to adjust to a different grade level for branding or adjust their merchandising practices in some other way. Retailers who normally have carried the Choice (or Prime) grade would also be affected by an increase in the supply of Choice relative to Good.

Packers: Packers may find it necessary to adjust buying practices to account more closely for cutability than in the past. Packers may have to renegotiate customary pricing practices with both their buyers and sellers. They will lose the option of quality grading and/or yield grading. Presently some carcasses with quality grade "highest" tend to yield grade "lowest." Therefore, some packers have found it advantageous to yield grade the 1's, 2's, and 3's but not the 4's and 5's and to identify the Prime and Choice, but not the "lower" grades. This option would no longer be available under the proposed changes. The option to grade or not grade would remain.

Feeders: Those feeders who attempt to feed a lot of cattle until a given proportion of the cattle grade Choice may find that this can be done with fewer days on feed using less feed. Feeders may have to give greater consideration to the reduction in cutability of cattle as they are fed to heavier weights. Discounts for "overfat"

cattle have occurred in the past mainly when there were a large number of overfat cattle coming to market or when the cattle were extremely and obviously "too fat." Greater attention may also need to be paid to the potential of purchased feeder cattle.

Producers: The elimination of conformation from the grade standards does not mean that this factor is not important in selection and breeding. Breeders can concentrate their efforts on muscling since variation in muscling affects yield grade. Cattle feeders may demand more verifiable information on feedlot performance of calves.

POSSIBLE CHANGES IN RESOURCE ALLOCATION

The proposed changes have the potential for increasing efficiency of beef production and hence reducing expenditures throughout the market system. They may also result in shifts in resource allocation in cattle raising and finishing.

Live cattle tend to trade on an "average basis." Present prices for slaughter cattle and beef carcasses may not reflect true value differences between individuals. Therefore, feeders may feed cattle longer using more feed and perhaps a different type of cattle than would be the case if the price received reflected differences in fatness.

As a beef animal gains weight in the feedlot each additional pound is composed of less protein and water and more fat. Fat requires more energy than muscle and maintenance requirements increase with weight so feeding becomes progressively more expensive. Most animals also move through the quality grades from Good to Choice to Prime, given enough time and feed. Marbling, conformation, and dressing percentage tend to increase through the feeding period while cutability decreases. The feeding period would tend to be shorter, other things the same, if there is a price discount associated with decreasing cutability than if there is not. Similarly the decrease in marbling required (for animals of typical "A" maturity) implies that some animals would grade Choice at a lower weight with less marbling under the proposed standards than under the current ones. If the feeder plans to feed to the Choice grade, then less feed will be required.

Lighter weights mean less meat as well as less fat. If the same total amount of meat is to be produced, this means either more cattle, or cattle of a larger mature size would be needed. Approximately two-thirds of the total feed energy utilized in producing a 1,000-pound slaughter steer is used by the cow and its breeding support, and the calf by the time the calf is weaned. A readjustment in resource use from concentrate feeding toward roughage and breeding resources could ensue.

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